# Annual Report
# 2004

# Ecology and management of feral hogs on Fort Benning, Georgia.

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## BACKGROUND AND JUSTIFICATION

Self-sustaining populations of feral swine have inhabited Fort Benning, Georgia, since at least the 1950s. Originating from free-ranging domesticated hogs and European boar (*Sus scrofa*) introduced for hunting, these populations recently have grown to the point where sightings are common and areas affected by their foraging are extensive. Because hogs forage by vigorous rooting, they can strongly affect their environment by disturbing soil, impeding regeneration of trees, disrupting understory plant communities, and altering habitat for numerous animal species. Hogs are also opportunistic omnivores, consuming a wide variety of plant and animal species. Of particular concern on Fort Benning, evidence is building that hog populations have the potential to strongly affect threatened and endangered animal and plant species such as the gopher tortoise (*Gopherus polyphemus*) and relict trillium (*Trillium reliquium*).

Because extensive military training is conducted on Fort Benning, effects of hogs on the infrastructure needed to conduct this training (e.g., rooting damage to drop zones and equipment, facilitation of erosion) is also of increasing concern.

The goal of this project is to investigate the efficacy of removal for reducing the impact of feral hogs on threatened populations and sensitive habitats and military training on the Fort Benning military installation. Currently, management of hogs on Fort Benning includes trapping and removal, as well as an open hunting season (over 2,000 hogs were harvested by hunters from 2001 to 2003). Future management efforts include increasing trapping efforts and broadening hunting opportunities, but the extent to which such efforts will be effective is unknown. The capacity for growth in a hog population is prodigious. Feral hogs breed throughout the year, and mature females can produce several litters of up to 16 piglets per year. The level of mortality needed to offset this potential depends on the size and demographic processes (i.e., annual survival, fertility, population growth rate) of the population, none of which are known. These processes must be understood before the number of removals needed to meet management goals can be estimated.

Because complete eradication of feral hogs on Fort Benning is unlikely, the population will continue to affect plant and animal communities. Understanding how these effects are related to the size of the hog population is therefore critical. Little has been published about distribution of hogs across available habitats on Fort Benning, or how effects of foraging are associated with hog densities. Before the negative effects of feral hogs on military training activities and threatened and endangered species can be mitigated, the distribution, density, movements, habitat affinities, and food habits of hogs must be understood.

**OBJECTIVES**

1. Estimate the relevant demographic parameters and sensitivities of feral hog populations (annual survival, fertility, and population growth rates) necessary to examine the effects of management practices on the Fort Benning area.
2. Evaluate the distribution, movements, and habitat use of feral hogs and associated effects on gopher tortoises and sensitive habitats.
3. Evaluate effects of feral hogs on species of special concern through food habits analysis.
4. Evaluate effects of feral hogs on military training.

5. Determine the efficacy of population control measures in reducing the impact of feral hogs on the distribution and abundance of gopher tortoises, sensitive habitats, and military training.

**PROGRESS**

Objective 1: During May-July 2004, we captured 100 feral pigs in large cage traps baited with dry and fermented corn. Of those 100 pigs, 91 individuals were marked with individually numbered ear tags in each ear to facilitate mark-recapture efforts. Approximately half of the trapped pigs were recaptured at later dates during the mark-recapture study. More males than females were caught in both study areas. Pigs ranging from one week old to over 2 years old were caught during the study period (Table 1).

Table 1.

| | Northern Study area | Southern Study area | Total |
|---|---|---|---|
| Total # of captures | 73 | 134 | 206 |
| Total # of individuals | 36 | 64 | 100 |
| Total # ear tagged | 36 | 55 | 91 |
| Percent recaptured | 52.7% | 53.1% | 53% |
| Sex ratio M:F | 2 : 1 | 1.4 : 1 | 1.6 : 1 |

This first year of data will allow us to estimate demographic processes (e.g., population size, survival rates, recruitment rates, and population growth rate) for both study areas. These data also represents the pre-treatment condition of the population of the Northern study area, providing a baseline that will allow us to examine demographic responses to control efforts.

Digital game cameras have been placed across both study areas to be used as a passive recapture method. Photographs of ear tagged pigs will be used to acquire more accurate estimates of survival rates for all age classes. Photographs of individually identifiable unmarked pigs along with ear tagged pigs may be used to get better estimates of population size and density. Using cameras that are currently set up, many ear tagged pigs have been re-sighted and other unmarked pigs have been sighted

multiple times. As of September 26, 2004, over 300 digital photos have been analyzed. The ratio of unmarked to marked pigs in the photos is very similar to the ratio of marked to unmarked pigs seen during trapping (Table 2). This suggests our sampling efforts were unbiased and the population was adequately sampled. Photographs have also been taken of seven different non-target species including deer, raccoons, and coyotes.

Table 2.

| Photographed pigs | Northern study area | Southern study area | Total |
|---|---|---|---|
| Marked | 4 | 8 | 12 |
| Unmarked | 4 | 6 | 10 |

Objective 2: During the mark-recapture study period, we affixed GPS collars to female pigs. Currently 10 sows are alive and still carrying VHF/GPS collars from the total of 17 that were collared during trapping. Of those that no longer carry the other 7 collars, 1 was shot by a hunter, 1 escaped her collar/harness combo, 3 have died from unknown causes, and 2 collars are producing mortality signals but have not yet been retrieved due to military training in the vicinity. At the start of the mark-recapture effort, collars were placed on 15 animals in combination with a nylon harness. We were concerned that the collar/harness combination might be responsible for the three unknown mortalities; recaptured animals with the harness/collar combination have shown weight loss, and one animal had a front leg caught in the harness. We are now using only the collar for new captures. Of the 10 active sows, seven have collar/ harness attachments, and three have collars only. We are working with our collar supplier, ATS, on a new collar design that may be an improvement over the current design. It is lighter and less bulky, and should allow greater freedom of movement. As collars are collected for refurbishment, we will to replace them all with the new design.

Radio-collared pigs are being located weekly through VHF telemetry. This is being done to ensure the GPS collars are functioning properly and as back up data in case we fail to retrieve a collar. VHF signals are broadcast Monday, Tuesday, Friday, and Saturday from 8 am to 10 pm. Since mid-August, we have collected 32 locations on 11 pigs. Four pigs have not been located since release, and may have dispersed off base. The collars attempt to obtain a self-location every five hours using GPS satellites. Preliminary GPS data from two retrieved collars provided 464 locations over 125

collar/days. These two collars obtained a self-location on 77% of all attempts. We have not analyzed any of the telemetry or GPS data, and will not do so until we recover more collars. These location data will provide information about habitat use, movement, and social fluidity.

Objective 3: We are collecting data from trapped and harvested animals to examine dietary habits, reproductive propensity and animal condition. As of September 29, 2003, eight stomachs samples and four reproductive tracts have been collected. Our goal is to harvest at least ten pigs a month from different installation locations to aid in understanding pig dietary habits. Collection of reproductive tracts and other organs will help to better understand the reproductive habits and condition of pigs inside and outside the treatment area.

Objective 4: To date, no data has been collected concerning this objective.

Objective 5: The above data are being assessed on 2 separate study areas on Ft. Benning. One area is being treated with lethal control, where the intent is to reduce the population as low as possible. The other area will serve as a control with no removal of pigs. As of September 29, 2004 thirteen pigs have been removed from the lethal area. Ten were removed through trapping and three through fire-arm harvest. We plan to compare population, movement, dietary, and reproductive data on both sites to assess whether population density influences any of these life-history aspects. The combination of these data should provide insight as to the best means for potentially controlling populations of nuisance feral pigs.

**FUTURE WORK (2004-2005)**

During the winter and spring of 2004-2005, a primary goal of the project is to reduce the feral pig population in the northern treatment area as much as possible. This will be accomplished through a combination of trapping, shooting, and with the assistance of hunters.

During the winter and spring of 2004-2005, digital game cameras will be operated continuously to passively recapture pigs. Cameras will be moved to new locations periodically to more completely sample each study area.

In late spring 2005, all GPS collars will be retrieved to download GPS location data and restore for additional use. These data, along with those collected in upcoming years will be used to estimate home ranges, movements, sociality, and habitat use of pigs. GIS data on landcover types and sensitive habitats will be obtained from Fort Benning to assist in these analyses.

During the summer of 2005, the mark-recapture study will be repeated in both the treatment and control study areas. The trapping and ear tagging of pigs will be conducted in the same manner as it was during the summer of 2004. This second mark-recapture trapping session will allow us to estimate the population growth rate for each study area, examine any changes in population size or density over a one year period, and begin estimation of the effects of increased mortality on the treatment area. We will attach GPS collars to a new set of 15 female pigs.

During 2004-2005, a survey will be developed to assess the impacts that feral pigs have on military operation on Ft. Benning. This survey will be distributed to Ft. Benning personnel and be designed so that type, extent, and cost of impacts can be assessed.

During the upcoming year, we will also develop methodology for sampling habitat in both study areas. These data will allow estimation of damage caused by feral pigs on sensitive habitats as well as the efficacy of lethal control in reducing the damage.